

XIII. *On the classification of British Crabronidae*
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PLATE XIX.

THE *Crabronidae*, owing to the number of their species, form a most important part of the British Hymenoptera Aculeata, and in the tabular classification that follows, I have attempted to show the relationship of the various groups, genera and species to one another. Some characters that have been very little used by British hymenopterists are largely utilised, since I have found them of great importance in dealing with exotic species. Edward Saunders in his admirable works recognised only two genera: *Entomognathus* with a single species and *Crabro* including all the others, employing, however, a number of subgenera of *Crabro* in his latest writings. I think that Ashmead, following the example of earlier classifiers, was correct in considering the *Crabronidae* to consist of many good genera, and also in grouping these genera together in divisions of a higher order, which he calls subfamilies, and these I have recognised here, without discussing the point as to whether the divisions are of subfamily value or not, since they are, at any rate, natural. To place our British species of *Crabro* in a single genus appears to me precisely the same as if all our butterflies (excluding *Hesperiidae*) were assigned to *Papilio* and a few subgenera of this.

Ashmead's deep insight into the affinities of the groups of Hymenoptera was rarely at fault, but his carelessness in the definition of characters of genera, etc., is well known, even when the genera themselves are perfectly valid. The type of his genus *Metacrabro* is our well-known species *Crabro lituratus*, the ♂ of which he says has no spur on the middle tibiae, but an unusual structure of the 2nd antennal joint. In neither of these points is he correct. The ♂ of his genus *Xestocrabo*, according to specimens sent to me from America, is also incorrectly said to be without

this spur. The common insect called by Saunders *Solenius vagus* appears to be congeneric with *Xestocrabo*, Ashm., but Ashmead's restriction of *Solenius*, if correct, excludes any British species from the latter, the American *Solenius* being very different in structure. I do not think that the genus *Stenocrabro*, Ash., is valid. It would probably contain our *Crossocerus varius*, etc., but it was based only on male characters. The American hymenopterist also largely employed sculpture in his generic divisions, and, I think, went too far in this respect, though not without some fair reason, when one examines the North American species of *Crabronidae*, where, as elsewhere, a similar style of sculpture runs through whole series of species. According to the same author the genus *Coelocrabro*, Thoms., is a synonym of *Blepharipus*, Lep., Morawitz having subdivided the latter previously. Our British species that stood under *Blepharipus* (*Coelocrabro*) are a very heterogeneous assemblage and are sure to be further subdivided, while one of them, *B. podagricus*, cannot possibly be considered as congeneric with the others. *Crabro vagabundus*, Panz., also appears to me to have very distinct generic characters. I have not been able to critically examine specimens of *B. styrius*, and it is possibly misplaced in my table and not really closely allied to *B. capitosus*. Two species (*C. elongatulus* and *wesmaeli*) are a discordant element in the genus *Crossocerus*.

The minute tubercles at the sides of the mesosternum in the small species of the *Thyreopinae* require careful examination, because the margin of the coxal cavities behind these is sometimes a little prominent, and might be mistaken for these tubercles. The latter are always placed well in front of the coxal cavities, at the point where the mesosternum slopes down to the latter, and in fact are the homologues of the carinae of the *Crabroninae*. I have referred to these structures indifferently as being "spinose" or "tuberculate," as the tubercles are often pointed. Owing to the interference of the dense clothing, it needs a little practice before it becomes easy to see the important structures of the clypeus, and to do so is greatly facilitated by opening the mandibles. The mandibular structure is so important and interesting in the *Crabronidae*, that these organs should always be spread open in some individuals of a species, and since only a few species are so small as 5 or 6 mm., and many are large insects, it requires very little skill or trouble to do this, when the

specimens are freshly caught, or after relaxing in the case of old examples.

In the *Thyreopinae* the erect hairs* of the antennae of the ♂ are in some of the smaller species not conspicuous on casual inspection, but they are worthy of attention since their arrangement and character show considerable variety in different species. Under no circumstances should specimens of *Crabronidae* be gummed on card, most of the important characters being hidden or obscured under this treatment.

TABLE OF SUBFAMILIES OR TRIBES.

- 1 (2). Antennae of ♂ 12-jointed, the flagellar joints beneath with appressed microscopic hairs or tomentum; both sexes with a carina bounding the posterior declivous portion of the mesosternum at the sides and with the recurrent nervure entering the cubital cell far beyond the middle of its lower side, the transverse cubitus longer than the distance between its lower extremity and the point of reception of the recurrent nervure, sometimes twice as long; basal abdominal segment not long and petiolar.

Crabroninae.

- 2 (1). Antennae of ♂ 13-jointed; both sexes without a carina and at most with a small spinous tubercle in place of the carina; recurrent nervure varying in position but usually received further from the extremity of the transverse cubitus than the length of the latter, and most often much further than this, sometimes near the middle of the lower side of the cubital cell.
- 3 (6). Basal abdominal segment not long and petiolar with the apex swollen.
- 4 (5). Mandibles of the ♂ always bidentate at apex, of the ♀ (except in *Hoplocrabro*) with two or more teeth. Antennae of ♂ with some or many of the flagellar joints with erect fine hairs beneath. If the mandibles of the ♀ are simple (*Hoplocrabro*) the occipital margin is produced into a prominent spine or angle at its extremity beneath the head *Thyreopinae*

* In the single ♂ of *C. styrius*, that I have examined, these hairs are not, or hardly, visible under a very strong lens, and even under a compound microscope are extremely short and sparse, but they are certainly present.

- 5 (4). Mandibles of ♂ and ♀ simple at the apex, not toothed; ocelli in a triangle with very wide base; antennae of ♂ not fringed with erect hairs beneath on the flagellar joints *Lindeniinae*.
- 6 (3). Abdomen with the basal segment entirely petiolate, but swollen at the apex *Rhopalinae*.

It must be understood that the above table is somewhat simpler than would have been the case had I included all the many exotic species that I have examined. Thus some of the petiolate species of other countries appear to me to belong to the *Crabroninae* and not to the *Rhopalinae*, and have no connection with the latter.

CRABRONINAE.

♂ ♂.

- 1 (2). Superorbital foveae deep and distinct; the front tarsi greatly dilated; head very strongly narrowed behind the eyes, so as to form a neck. *Thyreus*, Lep., *T. clypeatus*, Sch.
- 2 (1). Superorbital foveae wanting or represented only by very faint impressions or smooth areas near the eye-margins; head normal; front tarsi not laminately dilated.
- 3 (10). Mandibles without a tooth on the inner (upper) margin near the middle of its length; antennae with the third joint produced beneath near the middle and at the apex, the following joints also with projections at the apex beneath *Clytochrysus*, Mor.
- 4 (9). Ocelli in a nearly equilateral triangle; 3rd antennal tooth (or projection beneath) about as long as either of the two basal ones.
- 5 (6). First tooth with a thin tuft of fine hairs at the apex.
C. 6-cinctus, H. Schf. (= *saundersi*, Perk.).
- 6 (5). First tooth without such hairs.
- 7 (8). Emargination between the first and second antennal tooth very shallow compared with the following.
C. planifrons, Thoms.
- 8 (7). These emarginations or arches about equally deep.
C. cavifrons, Thoms.
- 9 (4). Ocelli in a more obtuse-angled triangle (but less wide at the base than in the following genera), 3rd antennal tooth much shorter than the first two and of minute size.
C. chrysostomus, Lep.
- 10 (3). Mandibles with a tooth on the inner margin towards the middle; antennae with the third joint simple.

- 11 (14). Sixth joint distinctly emarginate beneath
Xestocrabro, Ashm. (= *Solenius*, Auct.).
- 12 (13). Front femora becoming suddenly widened from the base, so as to be subangulate beneath near the base; clypeus produced in the middle at the apex; 3rd antennal joint short . . . *X. microstictus*, H. Schf. (= *larvatus*).
- 13 (12). Front femora gently rounded beneath from the base; clypeus broadly rounded apically in the middle; 3rd antennal joint longer, twice as long as wide or more.
X. vagus, L.
- 14 (11). Sixth antennal joint not emarginate beneath, all the joints simple.
- 15 (16). Tooth on inner edge of mandibles rather small; clypeus apically in the middle bluntly pointed; basal joint of middle tarsi simple. *Metacrabro*, Ashm., *M. lituratus*, Panz.
- 16 (15). Tooth on inner edge of mandibles very large; clypeus apically in the middle broadly rounded or almost truncate; basal joint of middle tarsi subangulately dilated.
M. (?) quadricinctus, F. (*interruptus*, Saund.) *an. gen. nov. ?*

CRABRONINAE.

♀ ♀.

- 1 (2). Superorbital foveae sharply defined; basal abdominal segment strongly punctured (mandibles 3-dentate at apex and with a tooth on the inner edge).
Thyreus, Lep., *T. clypeatus*, Schr.
- 2 (1). Superorbital foveae absent or ill-defined or very feeble; basal abdominal segment at most very finely and feebly punctured.
- 3 (12). Mandibles 3-dentate at apex and without a distinct tooth on the inner margin towards the middle, at most with the margin faintly sinuate or with a trace of an angulation.
- 4 (11). Antennae with the third joint very elongate, becoming in some aspects conspicuously slender behind the apical portion, fully twice as long as the fourth; clypeus apically in the middle strongly produced and on each side of the produced part there is a strong emargination, forming on each side a prominent tooth; ocelli generally in a sub-equilateral triangle (more obtuse-angled in *chrysostomus*).
Clytochrysus, Mor.
- 5 (10). Ocelli in a nearly equilateral triangle; size larger.

- 6 (7). Distance between the lateral angles of the median produced part of the clypeus, not less than the distance between one of these and the nearest lateral tooth.
C. cavifrons, Thoms.
- 7 (6). Distance between the lateral angles of the median produced part of the clypeus much less than the distance between one of them and the nearest lateral tooth.
- 8 (9). Face longer *C. planifrons*, Thoms.
- 9 (8). Face much wider across the eyes. *C. sexcinctus*, H. Sch.
- 10 (5). Ocelli in a triangle much widest at base, smaller, length about 11 mm. *C. chrysostomus*, Lep.
- 11 (4). Antennae with the third joint elongate but much less than twice as long as the fourth and not conspicuously attenuated behind the apical portion in some aspects; clypeus not strongly produced in the middle and with only a slight emargination on each side of this; so that all the angles are obtuse or feeble; ocelli in a triangle with very wide base. *Metacrabro*, Ashm., *M. lituratus*, Panz.
- 12 (3). Mandibles 3-dentate at apex, but with a very distinct additional tooth towards the middle of the inner margin.
- 13 (14). Mesonotum without or almost without punctures, transversely rugose in front and longitudinally behind; superorbital foveae represented by feeble depressions along the eye-margins, the depressions dull and finely punctured.
M. quadricinctus, F. (*interruptus*, Saund.) *an. gen. nov.?*
- 14 (13). Mesonotum densely punctured; superorbital foveae represented by feeble impressions, which are smooth and shining *Xestocrabro*, Ashm.
- 15 (16). Clypeus somewhat pointed or very narrowly rounded in the middle of its apical margin; 3rd antennal joint short; pygidial area much less elongated, the raised margins divergent from near the apex, not continuing subparallel for nearly half their length *X. microstictus*, H. Schf.
- 16 (15). Clypeus with the median part of its apical margin wide, truncate or slightly emarginate; third antennal joint long; pygidial area very greatly elongated, the raised margins subparallel for a long distance from the apex; a larger species *X. vagus*, L.

THYREOPINAE.



- 1 (6). Ocelli arranged in an isosceles triangle much widest at the base; recurrent nervure received far beyond the middle

of the lower side of the cubital cell, the distance between its point of reception and the extremity of the transverse cubitus being usually only about equal to the length of the transverse cubitus itself. Antennae with the flagellum subfusiform or at least with many of the joints wide and flattened. Front legs very abnormal, the tibiae with enormous lamellate expansions, which are broader than long, tarsi distorted *Thyreopus*, Latr.

- 2 (5). Mandibles at the base with a prominent spine or process.
- 3 (4). Mesonotum strigose *T. cribrarius*, Fab.
- 4 (3). Mesonotum punctate *T. scutellatus*, Schr.
- 5 (2). Mandibles at the base simple *T. peltarius*, Schr.
- 6 (1). Ocelli arranged in an equilateral triangle or nearly; recurrent nervure generally received near the middle of the cubital cell or at least much further distant from the end of the transverse cubital nervure than the length of the latter, very rarely with these distances not greatly unequal; antennae not conspicuously dilated or flattened; front legs with the tibiae rarely greatly dilated.
- 7 (10). Superior orbital foveae deep, distinct, narrow and elongate sublinear or elongate-triangular; legs simple.
Blepharipus, Lep.
- 8 (8). Clypeus in front with two great subprominent angles, which are very widely separated from one another.
B. leucostomus, L.
- 9 (7). Clypeus quite differently formed, produced in the middle apically *B. nigrinus*, Lep. (*pubescens*, Shuck.).
- 10 (7). Superior orbital foveae rarely distinct, deep and narrow, usually feeble or subobsolete, or represented by smooth spaces. If well-defined or deep they are short or broad or the front legs have some special modifications.
- 11 (14). Anterior area of propodeum ill-defined, not bounded completely, or almost completely, or by a distinct consute or crenate furrow.
- 12 (13). Front legs with the tibiae and tarsi dilated.
B. (?) cetratus, Shuck.
- 13 (12). Front legs simple, hind tibiae unusually incrassate.
- 13 (a) (13b). Clypeus produced into a strong median blunt tooth in the middle *B. (?) capitatus*, Shuck.
- 13 (b) (13a). Clypeus with the apical margin feebly 3-dentate, the middle tooth not strongly prominent. *B. (?) styrius*, Kohl.
- 14 (11). Anterior area of propodeum well defined by a usually consute or crenate furrow, rarely not altogether complete.

- 15 (40). Occipital margin not produced on each side beneath the head into a prominent spine.
- 16 (35). Small species with entirely black abdomen; the front tibiae either simple or laminately dilated, the front femora never armed with a spine beneath at about the basal third of their length. Recurrent nervure rarely received far beyond the middle of the lower side of the cubital cell.
- 17 (24). Seventh dorsal abdominal segment with only a fine and feeble or indefinite puncturation not greatly different from that of the preceding.
- 18 (21). Mesopectus simple, not tuberculate or spinose on each side.
- 19 (20). Front legs with the tibiae and first two tarsal joints conspicuously dilated, the front femora suddenly widened from the base, so as to form a distinct angle beneath; clypeus black *B. (?) gonager*, Lep.
- 20 (19). Front legs simple, clypeus yellow (?) *aphidum*, Lep.
- 21 (18). Mesopectus minutely spinose or tuberculate on each side.
- 22 (23). Middle tibiae normal with a calcar; hind tibiae normal; superorbital foveae feebly defined; mesonotal puncturation normal *B. (?) carbonarius*, Dahlb.
- 23 (22). Middle tibiae much thickened, elongate-triangular, only with a few short apical or subapical spines,* the true calcar usually wanting; hind tibiae much swollen; mesonotum not shining, but with extraordinarily minute puncturation; superorbital foveae short, generally punctiform. *Ablepharipus* gen. nov., *A. podagricus*, V. d. Lind.
- 24 (17). Seventh dorsal segment with a peculiar sculpture, at least on its apical portion (the punctures being large and close, though generally shallow) or quite different from that of the preceding.
- 25 (32). Mesopectus on each side with a distinct minute spine or tubercle.
- 26 (27). Front tibiae very greatly laminately dilated.
Crossocerus, Lep., *C. palmarius*, Schr.
- 27 (26). Front tibiae not dilated, the basal joint of front tarsi sometimes dilated (*Stenocrabro*, Ashm.).
- 28 (29). Front tarsi with the basal joint conspicuously dilated.
C. palmipes, L.
- 29 (28). Front tarsi not evidently dilated.

* I have mentioned this character, in spite of its inconstancy, on account of the interest of its variability.

- 30 (31). Anterior area of propodeum on each side of the median channel rugose or striate *C. varius*, Lep.
- 31 (30). Anterior area with a smooth polished space on each side of the channel *C. ovalis*, Lep. (*anxius*, Wesm.).
- 32 (25). Mesopectus without a spine or tubercle on each side.
- 33 (34). Anterior area of propodeum with a smooth space on either side of the median channel, this space being at the most very faintly rugulose even under a very strong lens.
C. (?) wesmaeli, V. d. Lind.
- 34 (33). Anterior area closely rugose or striate.
C. (?) elongatulus, V. d. Lind.
- 35 (16). Large species with yellow-marked abdomen; either the front tibiae are angulately dilated (but not laminate) or the front femora have a spine beneath. Recurrent nervure always received far beyond the middle of the lower side of the cubital cell.
- 36 (37). Superorbital impressions, deepish, large and very distinct, not situated in wide lateral depressions of the head; front femora with an angular spine beneath before the middle; basal abdominal segment ordinary not lengthened, the spiracles not further apart than the distance from them to the base of the abdomen; 7th ventral segment without erect spines, but with a basal elevation (mandibles with a well-developed tooth near the middle of their inner margin; clypeus with a distinct median truncate or slightly emarginate production of its apical margin and with a well-marked angle on each side exteriorly to this.
Acanthocrabro gen. nov., *A. vagabundus*, Pz.
- 37 (36). Head widely depressed on each side to the ocellar region, the superorbital foveae sometimes ill defined, sometimes with the inner margin raised so as to form a longitudinal division of the large lateral depressions of the head; basal abdominal segment elongated, the spiracles not so far apart as the distance from them to the base of the segment; 7th ventral segment with two erect spines.
Cuphopterus, Mor.
- 38 (39). Hind tibiae spinous above, the hind femora unarmed, the hind coxae with a spine or angular projection beneath (mandibles on their flat surface impressed between the longitudinal carinae) *C. dimidiatus*, Fab.
- 39 (38). Hind tibiae unarmed, the hind femora with a spine or tooth beneath towards the base inwardly.
C. signatus, Panz.
- 40 (15). Occipital margin of the head produced into a prominent

spine on the underside of the head (clypeus with five emarginations, which produce six nearly equidistant teeth); all the legs simple; superorbital foveae represented by smooth, slight callosities; mandibles bidentate, the inner edge edentate.

Hoplocrabro, Thoms., *H. 4-maculatus*, Fab.

THYREOPINAE.

♀ ♀

- 1 (6). Ocelli in a triangle much widest at the base, recurrent nervure received by the cubital cell far beyond the middle of its lower side and at a distance from the apex subequal to (or at most rather longer or shorter than) the length of the transverse cubitus. Mandibles bidentate at apex and without a tooth on the inner margin. Pygidial area flat, triangular, roughly punctured and setose *Thyreopus*, Latr.
- 2 (3). Mesonotum longitudinally rugose . . . *T. cribrarius*, Fab.
- 3 (2) Mesonotum punctured.
- 4 (5). Lateral prothoracic angles not prominent.
T. scutellatus, Schr.
- 5 (4). Lateral angles of pronotum prominent. *T. peltarius*, Schr.
- 6 (1). Ocelli in a triangle that is equilateral or nearly; recurrent nervure generally received near the middle of the lower side of the cubital cell, very rarely at a distance from the apex subequal to the length of the transverse cubitus. Mandibles generally tridentate at apex (if bidentate, the species are very small and the abdomen is black); pygidial area often excavated, or shining though in some small species closely punctured and setose.
- 7 (16). Anterior area of the propodeum not clearly defined by distinct and generally complete furrows, that are usually consute or crenate *Blepharipus*, Lep.
- 8 (13). Mandibles at the apex tridentate; mesopectus spinose or tuberculate on each side, faintly so in *cestratus*. Superorbital foveae deep or deepish, distinct and narrow.
- 9 (12). Head above and mesonotum clothed with long or longish erect hair; mesosternum not polished and with a copious fine puncturation.
- 10 (11). Head in front of the anterior ocellus more or less transversely depressed or sloping from the eye-margin to the median impressed line, the surface polished and more or less sparsely or irregularly punctured . . . *B. leucostomus*, L.

- 11 (10). Head in front of the anterior ocellus with the surface on each side of the median impression not at all depressed but slightly convex, and not polished, finely punctured.
B. pubescens, Shuck.
- 12 (9). Head above and mesonotum with short and much less conspicuous hairs; mesosternum polished, finely and remotely punctured, very deeply excavated posteriorly; tubercles of the mesopectus very feebly developed.
B. (?) celratus, Shuck.
- 13 (8). Mandibles at the apex with four teeth, the innermost the smallest; mesopectus not spinose; superorbital foveae more or less feeble and shallow.
- 14 (15). Hind tibiae unarmed, not spinose above; clypeus produced in the middle into a strong, blunt, narrow, apical tooth or process, and with a smaller and shorter tooth on each side of this *B. (?) capitosus*, Shuck.
- 5 (14). Hind tibiae armed with spines; clypeus not produced into a strong narrow median tooth, but faintly 3-dentate or 3-tuberculate **B. (?) styrius*, Kohl.
- 16 (7). Anterior area of propodeum defined by a distinct crenate or crenate furrow, usually complete, very rarely a little incomplete.
- 17 (42). Mandibles either bidentate or tridentate at the apex (the teeth sometimes worn down or blunt); occipital margin beneath the head not produced into a prominent spine or angle at its apical extremity.
- 18 (37). Small species, with black (not yellow-marked) abdomen; superorbital foveae small or feeble or marked only by smooth spaces or faint impressions.
- 19 (26). Pygidial area with the sides strongly raised so that it appears excavated.
- 20 (25). Mandibles tridentate.
- 21 (24). Mesopectus not spinose or tuberculate on each side.
- 22 (23). Clypeus with a distinct prominent tooth on each side of the middle of the apical margin; clypeus black.
B. (?) gonäger, Lep.
- 23 (22). Clypeus somewhat broadly rounded or nearly truncate in the middle of the apical margin; clypeus wholly or largely yellow *B. (?) aphidum*, Lep.
- 24 (21). Mesopectus tuberculate or spinose on each side.
B. (?) carbonarius, Dahlb.

* I have not been able to examine the mandibles of this species, and its position here is doubtful.

- 25 (20). Mandibles bidentate at apex (pygidial area dull, the surface with microscopic sculpture and without appressed setae, the raised sides thickened about the middle), mandibles with a distinct tooth on the inner margin near the middle, the mesopectus spinose or tuberculate; mesonotal puncturation excessively minute.
Ablepharipus gen. nov., *A. podagricus*, V. d. Lind.
- 26 (19). Pygidial area triangular, not narrowly produced apically, finely margined, not impressed or excavated, often clothed with appressed setae, sometimes shining and punctate, but not setose; mesonotal puncturation fine, but ordinary.
- 27 (34). Pygidial area dull, punctate, with conspicuous decumbent setae on the apical portion; mesopectus with a small spine or tubercle on each side (mandibles bidentate at apex). *Crossocerus*, Lep.
- 28 (29). Clypeus more or less yellow or all yellow; superorbital foveae obsolete *C. palmarius*, Schr.
- 29 (28). Clypeus black beneath the silvery hairs; superorbital foveae shallow but wide subovate or subpyriform.
 (? subgen. *Stenocrabro*, Ashm).
- 30 (33). Anterior area of propodeum finely rugose or striate.
- 31 (32). Front legs with the calcar often dark; the median channel of the anterior area of the propodeum wider and with larger spines on the mesopectus . . . *C. palmipes*, L.
- 32 (31). Front legs with the calcar usually pale; the median channel of propodeum narrower and smaller mesopectoral spines or tubercles *C. varius*, Lep.
- 33 (30). Anterior area of the propodeum with smooth, polished area on each side of the median channel. *C. anxius*, Wesm.
- 34 (27). Pygidial area polished and with large punctures; mesopectus not tuberculate laterally.
- 35 (36). Middle tibiae black, yellow only at the base; pygidial area black *C. (?) elongatulus*, V. d. Lind.
- 36 (35). Middle tibiae yellow above; pygidial area red apically.
C. (?) wesmaeli, V. d. Lind.
- 37 (18). Large species, abdomen with yellow marks; superorbital foveae large and distinct, well-impressed and dull, or else placed in wide lateral depressions of the head, which extend from the eye-margins to the ocellar region.
- 38 (39). Recurrent nervure received by the cubital cell far beyond the middle, or not much more distant from the apex than the length of the transverse cubital nervure; pygidial area elongate and narrow, and behind the apical part with a median longitudinal carina; superorbital foveae

large, deepish, very distinct, subtriangular, dull; mandibles with a very distinct tooth on the inner edge, 3-dentate at apex; basal abdominal segment not unusually long, the spiracles wider apart than the distance to the base of the segment.

Acanthocrabro, gen. nov., *A. vagabundus*, Panz.

39 (38). Length of transverse cubitus very much less than the distance between its extremity and the recurrent nervure; pygidial area much less narrowly prolonged apically; sides of the head above much and widely impressed; the super-orbital foveae smooth, placed in these impressions, large, but sometimes ill-defined; mandibles 3-dentate, and with a feeble angulation on the inner margin; basal abdominal segment narrow and elongate, the distance between the spiracles less than that from them to the base of the segment *Cuphopterus*, Mor.

40 (41). Superorbital foveae distinctly margined on the inner side, so as to form a distinct longitudinal division of the lateral depressions of the head in which they are placed.

C. signatus, Panz.

41 (40). Superorbital foveae ill-defined inwardly, not forming a raised line *C. dimidiatus*, Fab.

42 (17). Occipital margin produced at its apex beneath the head into a prominent spine or angle; mandibles simple at the apex; pygidial area flat, triangular, the margins fine, the surface dull, microscopically granulate, and with sparse large punctures.

Hoplocrabro, Thoms., *Hoplocrabro 4-maculatus*, F.

In the *Thyreopinae* the relationship of *Blepharipus* (*Coelocrabro*) *gonager*, *B. aphidum* and *B. carbonarius* to the typical *B. nigritus*, etc., seems to me remote, while the first named (*gonager*) is also remote from the two following. *C. wesmaeli* and *elongatulus* will probably be found generically distinct from the rest of *Crossocerus*. A more extensive collection of the small black species of America is necessary before these points can be decided.

RHOPALINAE.

♂ ♂.

I (2). Antennae highly modified, third joint very small, not strongly divided from the large and long fourth joint, which is strongly widened from the base, the fifth elongate and

arched beneath. Clypeus very strongly produced in the middle, with an angle on each side of the median production. Front and middle metatarsi abnormal, though not greatly dilated; apex of occipital margin beneath the head produced into a spine as in *Hoplocrabro*; a median frontal prominence between the antennae.

Rhopalum, Kirby, *R. tibiale*, Lep.

- 2 (1). Antennae nearly simple, the 6th joint with a slight emargination or arch beneath; clypeus and face ordinary; metatarsi simple . . . *Physoscelis*, Lep., *P. clavipes*, Linn.

♀ ♀

- 1 (2). Clypeus strongly produced in the middle and with distinct lateral angles; face with a mediofrontal prominence; pygidial area apically produced and excavated; hind tibiae conspicuously spinose above.

Rhopalum, K., *R. tibiale*, Lep.

- 2 (1). Clypeus ordinary; pygidial area dull, with dense microscopic granulation, its margins very feeble, hardly produced apically, not excavated; face simple; hind tibiae inconspicuously spinose . . . *Physoscelis*, Lep., *P. clavipes*, L.*

LINDENIINAE.

- 1 (4). Eyes bare; mandibles simple *Lindenius*, Lep.
 2 (3). ♂ hind tibiae yellow above; ♀ hind tibiae yellow only at the base, usually for about one-fourth of their length.

L. albilabris, Fab.

- 3 (2). ♂ hind tibiae yellow on the basal half only or less; ♀ hind tibiae yellow except at the apex. *L. panzeri*, V. d. Lind.

- 4 (1). Eyes hairy; mandibles with a prominent angle near the base beneath.

Entomognathus, Dahlb., *E. brevis*, V. d. Lind.

* Since the above was written a second species of *Rhopalum* has been added to our list by Col. C. G. Nurse (Ent. Mo. Mag. 1913, p. 83). It may be distinguished as follows:

- a. Clypeus in the middle triangular (rounded in ♂ at apex, acute in ♀), tegulae pale *R. tibiale*, Lep.
 b. Clypeus in the middle truncate, tegulae black; abdomen wholly black *R. kiesewetteri*, Mor.

EXPLANATION OF PLATE XIX.

- FIG. 1. Right side of head (in dorsal aspect) of *Acanthocrabro vagabundus* ♀, showing the large and definite (strongly depressed) superorbital foveae, between the inner margin of the eye and the ocelli.
2. The same of *Blepharipus leucostomus* ♀, the fovea deep and narrow.
 3. Stigma and cubital cell of *B. leucostomus* ♀, showing the point of reception of the recurrent nervure in the lower side of the cell.
 4. The same in *A. vagabundus* ♀.
 5. The same in *Crossocercus varius*.
 6. The same in *Cuphopterus dimidiatus*.
 7. The same in *Metacrabro* (?) *quadricinctus*, (= *interruptus*, Saund.). Cc. = cubital cell; T. c. transverse cubitus; St. stigma; Rn. recurrent nervure.
 8. Mandible of *Clytochrysus cavifrons* ♀ in two aspects; the apex tridentate and no distinct tooth on the inner margin.
 9. The same of *A. vagabundus* ♀, the lower figure showing the distinct tooth on the inner margin.
 10. Mandible of *Metacrabro* (?) *quadricinctus* ♀, tridentate at apex and with an inner marginal tooth; one of the apical teeth lies mostly beneath the other owing to the position.
 11. Mandible of *A. podagricus* ♀; bidentate at apex and with an inner tooth. More highly magnified than the other species.
 12. Mandible of *B. (?) capitosus* ♀; 4-dentate apically.
 13. Mandible of *T. cribrarius* ♀, simply bidentate at apex.
 14. The same of *Hoplocrabro 4-maculatus* ♀, the apex simple.
 15. Pygidial area of *Xestocrabro vagus* ♀.
 16. The same of *B. leucostomus*; narrowly produced and excavated.
 17. The same of *H. 4-maculatus*; flat, sparsely punctured and with appressed setae apically.
 18. The same of *X. microstictus (larratus)*; the area much less produced apically than that of *vagus*.
 19. The same of *C. varius*; the area is densely punctured and clothed with appressed setae.
 20. Apical margin of elypeus of *H. 4-maculatus*; the upper figure of the ♂, the lower of the ♀.
 21. Apex of elypeus of *B. (?) gonager* ♀ (more highly magnified than the preceding figure).

22. Apex of clypeus of *B. (?) capitosus* ♀.
23. Arrangement of ocelli of *C. chrysostomus*.
24. The same in *C. cavifrons*.
25. The same in *M. (?) quadricinctus* ♂ (= *interruptus*, Saund.).
26. Metatarsus of middle leg of *M. (?) quadricinctus*.
27. Tibia of front leg of *C. dimidiatus* ♂.
28. Third, 4th and 5th antennal joints of *C. sexcinctus* ♂.
29. The same of *C. chrysostomus* ♂.
30. Third antennal joint of *C. palmarius* ♂, showing erect hairs, characteristic of *Thyreopinae*.
31. Third, fourth and fifth antennal joints of *C. cavifrons* ♀ showing characteristic 3rd joint of *Clytochrysus*.
32. Third and fourth in *Metacabro lituratus* ♀.
33. The same of *M. (?) quadricinctus* ♀ (= *interruptus*, Saund.).